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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/880,465	06/12/2001	Sean Michael Seutter	005643/CALB/L/B	5220

32588 7590 05/21/2003

APPLIED MATERIALS, INC.  
2881 SCOTT BLVD. M/S 2061  
SANTA CLARA, CA 95050

EXAMINER

NGUYEN, HA T

ART UNIT PAPER NUMBER

2812

DATE MAILED: 05/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/880,465

Applicant(s)

SEUTTER ET AL.

Examiner

Ha T. Nguyen

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s): \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 6) ☐ Other

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 1. Certified copies of the priority documents have been received.  
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| 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 | 6) Other:  |

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### DETAILED ACTION

1a. Applicant's election without traverse of Group I. claims 1-23 in Paper No. 4 is acknowledged.

#### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 5, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Diem et al. (U. S. Patent 4726961, hereinafter "Diem").

[Claim 1] Diem discloses a method of depositing a tungsten film onto a wafer comprising the steps of: a) introducing a metalorganic tungsten-containing compound into a deposition chamber of a CVD apparatus; b) maintaining the deposition chamber at a pressure and the wafer at a temperature suitable for the high pressure chemical vapor deposition of the tungsten film onto the wafer; c) thermally decomposing the tungsten-containing compound in the deposition chamber; d) vapor-depositing the tungsten film, into the wafer thereby forming a low-resistivity tungsten film (See Summary and col. 2, lines 24-28)

[Claim 5] wherein the metalorganic W-containing compound is a  $W_x(CO)_y$  compound;

[Claim 6] wherein the compound is W hexacarbonyl (see Summary).

#### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103<sup>©</sup> and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 2-4 and 7- 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Diem in view of Fiordalice et al. (U.S. Patent 5429989, hereinafter "Fiordalice").

[Claim 2] Diem also discloses wherein the introduction of the metalorganic W-containing compound into the deposition chamber of a CVD apparatus comprises the steps of: a) subliming the metalorganic W-containing compound to a gaseous phase; b) stabilizing the flow of the W-containing gas; and d) flowing the W-containing gas to the deposition chamber (See col. 5, lines 12-50 ), the examiner interprets the stabilizing being done during the gas flowing from the reservoir through the conduit to the interior of the deposition chamber (see Fig. 3). But it does not disclose expressly c) mixing the W-containing gas with a carrier gas and flowing the W-containing /carrier gas mixture. However, the missing limitation is well known in the art because Fiordalice discloses it is a conventional practice to transport W-containing gas using a carrier gas; [Claim 4] wherein the carrier gas is Ar, He, N<sub>2</sub> (See col. 6, lines 4-13). A person of ordinary skill is motivated to modify Diem with Fiordalice to ensure a controlled flow of W-containing gas to the chamber.

[Claim 3] Diem also discloses the sublimation occurs at approximately 90C (see col. 5, lines 12-19 ). But it does not disclose expressly wherein the sublimation occurs at about 75C. However, W(CO)<sub>6</sub> starts to sublime at 75C (Koloski et al. , USPN 5977241, col. 24, lines 22-25 is cited to support this statement), it would have been obvious for a person of ordinary skill in the art to use the appropriate temperature to obtain the desired vapor pressure of the vaporized compound.

[Claim 7] Diem also discloses wherein the chamber pressure is from about 0.1 Torr to about 20 Torr (see col. 6, lines 3-13); [Claim 8] wherein the wafer temperature is from about

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200C to about 500C (see par. bridging cols. 6 and 7);[Claim 9] wherein the sheet resistivity is 0.8 ohms per square and Fiordalice discloses the resistivity of the W film is less than about 30 micro-ohm centimeter:[ Claim 10] wherein the resistivity of the W film is from about 10 micro-ohm centimeter to about 20 micro-ohm centimeter(see col. 6, lines 14-29). In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists (See MPEP 2144.05).

[ Claim 11] The arguments for the rejection of claim 1 and 2 also apply.

[ Claim 20] The arguments for the rejection of claim 1, 2, 3, 7, and 8 also apply.

[Claims 12-19 and 21-23] The arguments for the rejection of claims 3-10 also apply.

Therefore, it would have been obvious to combine Diem with Fiordalice to obtain the invention as specified in claims 2-4 and 7- 23.

### ***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ha Nguyen whose telephone number is (703)308-2706 . The examiner can normally be reached on Monday-Friday from 8:30AM to 6:00PM, except the first Friday of each bi-week.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling, can be reached on (703) 308-3325. The fax phone number for this Group is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.



Ha Nguyen

Primary Examiner

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